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Improved Recordings of the Optical Intrinsic Signals in the Neonatal Rat Barrel Cortex

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Abstract

© 2016, Springer Science+Business Media New York.Optical imaging of intrinsic signals (OIS) is widely used for the functional cortical mapping in vivo. Recently, OIS is also implemented for the functional mapping in the neonatal rat barrel cortex. However, the OIS is characterized by relatively low signal to noise ratio (SNR). Here, we determined parameters for post hoc data analysis that allowed improving OIS mapping and analysis in the developing rat barrel cortex in vivo. We found that application of spatial Gaussian filtering with sigma of 1 px increases the OIS SNR almost twofold. Additional light correction and low-pass temporal filtering with 1 s window size resulted in further improvement of the OIS SNR. Thus, the proposed digital filtering can substantially improve quality of the OIS recordings in the developing somatosensory cortex.

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Keywords

Barrel cortex, Development, Functional imaging, Intrinsic signal, Somatosensory cortex

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